

CLAIMS

1. A transfer case for a vehicle having front and rear axles,
comprising:

a planetary gear set including first, second and third members;
said first member being continuously connectable with the front

5 axle;

said second member being continuously connectable with the rear
axle;

an input shaft selectively connectable with said first, second or
third members; and

10 said transfer case providing rear wheel drive when the second
member is connected with the input shaft, all-wheel drive when the third
member is connected with the input shaft, and front wheel drive when the
first member is connected with the input shaft;

wherein, in all-wheel drive, the absolute value of the torque of the
15 third member is equal to the sum of the absolute values of the torques of the
first and second members.

2. The transfer case of claim 1, wherein said planetary gear set
comprises a simple planetary gear set, said first member being a ring gear,
said second member being a sun gear, and said third member being a carrier.

3. The transfer case of claim 1, wherein said planetary gear set
comprises a compound planetary gear set, said first member being a sun
gear, said second member being a carrier, and said third member being a
ring gear.

4. The transfer case of claim 1, wherein a front ratio of the front axle is different from a rear axle ratio of the rear axle.

5. The transfer case of claim 1, further comprising a plurality of dog clutches and synchronizers for selectively engaging said input shaft with said first, second or third members.

6. The transfer case of claim 6, wherein one of said plurality of dog clutches is a two-way dog clutch.

7. The transfer case of claim 1, further comprising a transfer chain connected between the front axle and said first member.

8. The transfer case of claim 7, wherein a front axle ratio of the front axle times a chain ratio of said transfer chain is different from a rear axle ratio of the rear axle.

9. A drive train for a vehicle, comprising:

front and rear axles; and a transfer case including:

a planetary gear set including a sun gear, carrier and ring gear;

5 said ring gear being continuously connected to the front axle;
 said sun gear being continuously connected to the rear axle;
 an input shaft selectively connectable with said sun gear,
 carrier or ring gear; and

10 said transfer case providing rear wheel drive low when the
 sun gear is engaged with the input shaft, all-wheel drive when the carrier is
 engaged with the input shaft, and front wheel drive high when the ring gear
 is engaged with the input shaft.

10. The drive train of claim 9, wherein said planetary gear set comprises a simple planetary gear set.

11. The drive train of claim 9, wherein a front axle ratio of the front axle is different from a rear axle ratio of the rear axle.

12. The drive train of claim 9, further comprising a plurality of dog clutches and synchronizers for selectively engaging said input shaft with said sun gear, ring gear or carrier.

13. The drive train of claim 12, wherein one of said plurality of dog clutches is a two-way dog clutch.

14. The drive train of claim 9, further comprising a transfer chain connected between the front axle and said ring gear.

15. The drive train of claim 14, wherein a front axle ratio of the front axle times a chain ratio of said transfer chain is different from a rear axle ratio of the rear axle.

16. A drive train for a vehicle, comprising:
 front and rear axles having different axle ratios; and
 a transfer case including:
 a planetary gear set including a sun gear, carrier and ring
 5 gear;
 said ring gear being continuously connected to the front axle;
 said sun gear being continuously connected to the rear axle;
 an input shaft selectively connectable with said sun gear,
 carrier or ring gear;

- 10 a plurality of dog clutches and synchronizers for selectively
engaging said input shaft with said sun gear, ring gear or carrier; and
 said transfer case providing rear wheel drive low when the
sun gear is engaged with the input shaft, all-wheel drive when the carrier is
engaged with the input shaft, and front wheel drive high when the ring gear
15 is engaged with the input shaft;
 wherein said planetary gear set comprises a simple planetary
gear set.